association will also come, unless Section A proves too attractive.

Following its custom of recent years, the section, meeting jointly with the Psychological Subsection, will give Monday to the consideration of psychological investigations, so far as they illuminate educational practice. Dr. Kimmins will read a paper on the need for educational research, which will be followed by a discussion, and papers on the psychological processes involved in learning to read and spell will be read. On Tuesday a demand for the registration of schools will be raised by Mrs. Bryant, Bishop Welldon, and Bishop McIntyre; and Mr. P. B. Ballard, Mr. T. S. Usherwood, and Mr. W. F. Fowler will present the case for handwork as a factor in education. On Wednesday, Sir George Fordham will read an important paper on the working of the Act of 1902. This should provoke considerable interest in view of coming legislation. Other papers to be read include one on "The Use of Suggestion in Discipline and Training," by Mrs. Meredith, and the Montessori method, by Dr. Jessie White.

Section M (Agriculture).—As usual in the agricultural section, a special feature is being made of joint discussions with other sections. An important meeting is being held with the botanists, when prolificness of barley is to be discussed. The chief British authority, Mr. E. S. Beaven, is giving an account of his extensive trials, and Messrs. Hunter, Hackett, and Bennet are describing the experiments made by the Irish Department of Agriculture. Another meeting is arranged with the physiologists to discuss the factors influencing sterility and fecundity in live-stock. Dr. F. H. A. Marshall is opening the discussion, and Messrs. K. J. J. Mackenzie, L. Doncaster, G. W. Smith, and others are expected to take part. The section is also participating in the biochemical discussion on fermentation.

A number of papers of very general interest are promised. Sir Richard Paget is dealing with the possibility of partnership between landlord and tenant. Prof. Fraser Storey describes the German forestry methods, and Mr. Walter Collinge is to deal with a curious disease of cereals. Considerable attention is being devoted to soil problems. Mr. T. Goodey is giving a summary of his investigations at Rothamsted on the protozoa of the soil, and Dr. Hutchinson and Mr. McLennan are describing experiments showing that soil may be partially sterilised by means of caustic lime. Mr. C. T. Gimingham is presenting an account of ammonification and nitrification in pasture soils.

Ecologists will be interested in Dr. Winifred Brenchley's summary of the relationships of weeds to arable land. Miss Taylor is dealing with certain fruit problems, and Messrs. Barker and Gimingham with Bordeaux mixture. The foreign guest is Prof. Sörensen, from Copenhagen, who will be very generally welcomed by men of science in this country.

Altogether the programme promises to be of considerable interest. Among the excursions is a visit to the Burbage Experimental Station, where Major Hurst's breeding experiments are to be seen.

NOTES.

We announce with great regret that Prof. Francis Gotch, F.R.S., Waynflete professor of physiology in the University of Oxford, died on July 15 at sixty years of age.

We regret to announce the death on July 3, in his fifty-sixth year, of Dr. R. Lendlmayr von Lendenfeld, professor of zoology and rector of the German University at Prague.

Prof. A. Fowler, F.R.S., has been awarded the Valz prize of 450 francs by the French Academy of Sciences for his investigation of the principal series of hydrogen lines and other contributions to astronomical physics.

Dr. Hans Busch has taken over the editorship of the *Physikalischen Zeitschrift,* and it is requested that contributions for that journal be addressed to him at Göttingen, Friedländerweg 61.

The death is reported, in his seventy-first year, of Dr. Charles Greene Rockwood, who was professor of mathematics and natural philosophy at Bowdoin College from 1868 to 1873, professor of mathematics and astronomy at Rutgers College from 1873 to 1877, and professor of mathematics at Princeton from 1877 to 1905. Prof. Rockwood was a member of the Princeton Eclipse Expedition to Colorado in 1878, and contributed a large number of articles on seismology to American scientific periodicals.

The science section of the R. Accademia di Bologna has issued a circular relating to the first biennial prize of 3000 lire from the fund given by Prof. Elia De Cyon for the encouragement of scientific research. Memoirs are invited on a number of subjects, including the functions of the cardiac and vasomotor nervous systems, the functions of the thyroid and pineal glands, and of the labyrinth of the ear. The memoirs may be written in Latin, Italian, French, or English. The award will be made on March 1, 1915. Full particulars can be obtained from the secretary of the academy, Mr. Ercole Giacomini, at Bologna.

Mr. John Muir, the American naturalist, is appealing to nature-lovers throughout the United States to use their influence to save the Yosemite National Park from spoliation. The city of San Francisco is trying to rush through Congress a Bill permitting it to acquire the Hetch Hetchy Valley as a site for a reservoir. The proposed scheme would turn this valley into a lake, and would close to the public the Grand Canyon of the Tuolumne, a river which at this point is a succession of waterfalls of every variety of height and beauty. This would mean depriving the rest of the United States of 500 square miles, or more than one-half the total area of the present National Park. Mr. Muir supports his protest by showing that this destructive scheme is not really essential to meeting the needs of San Francisco, which could find other, if more expensive, sources of water supply. He quotes the report of an advisory board of army engineers in support of this contention.

Until quite recently the discovery of pygmy flints, established in England by Rev. R. A. Gatty, had not been confirmed in Scotland. Mr. R. M. Leslie Paterson, in *Man* for July, now reports the discovery of flints of this type near the confluence of the river Feugh with the Dee, on the 10-ft. terrace level. This district abounds in stone circles, and contains burial-places and pottery of the Bronze age, thus showing that it was continuously occupied by prehistoric man. The present discoveries include pygmy flints of various types—rough knives, duck-bill and thumb scrapers, borers, and a saw. But, curiously enough, not a single arrow-head has yet been found.

It has hitherto been believed that the Maori religion represented a cult of the powers of nature, with ancestor worship; that they had no conception of a Supreme Being, and that their deities were malevolent, to whom no true invocations were offered, but merely rude charms and incantations. In *Man* for July Mr. Elsdon Best, on information received from an old member of the tribe, describes the cult of one of the late Mr. Andrew Lang's "High Gods of Low Races," in the worship of a deity known as Io, whose name was deemed so sacred that it was never uttered in public. The priest is said to have performed his devotions in a secluded spot in the forest, or he used to enter a river in a state of nudity, and stood waist-deep in the water, having first immersed the upper part of his body. The account of this remarkable cult is full, and apparently authoritative, however it may conflict with our preconceived views of the religious beliefs of the Maori people.

We are indebted to the author, Mr. L. M. Lambe, for a copy of a paper from *The Ottawa Naturalist*, vol. xxvii., p. 21, on the bones of a fore-limb of an iguanodont dinosaur of the genus Trachodon from the Edmonton formation of Alberta, Canada.

In vol. ix., No. 11, of *The South African Journal of Science*, reference is made to the discovery in the Lower Cretaceous marls of Bushman's River—the locality where the type skull of Owen's *Anthodon serrarius* was obtained—of the broken femur of a reptile fully as large as the corresponding bone of Diplodocus, and, when complete, measuring about 5 ft. in length. Whether it belongs to Anthodon, now believed to be a dinosaur, remains to be proved.

Since the publication of Mr. Boulenger's volume on the reptiles and amphibians in the "Fauna of British India," two new species of land tortoises, namely *Testudo travancorica*, of the Western Ghats, and *T. baluchiorum*, from Baluchistan, have been added to the Indian list, while *T. latinuchalis* and *T. horsfieldi* have been shown to range into the British Indian area. A third new species, *T. parallelus*, from the Singhbhum district of Chota Nagpur, is described by Dr. Annandale in the second part of vol. ix. of Records of the Indian Museum. In the same paper Dr. Annandale also describes a new species of terrapin from Chota Nagpur, under the name of *Geoëmyda indopeninsularis*, which is of interest as showing that the genus Nicoria is inseparable from Geoëmyda, in the sense in which these terms are used in the "Fauna." This obviates much confusion in nomenclature, as it renders superfluous the name Heosemys, proposed by Dr. Stejneger to replace Geoëmyda, as employed by Mr. Boulenger.

The co-existence of man with extinct animals in South Africa forms the subject of an article by Dr. R. Broom in vol. xii., part 1, of the Annals of the South African Museum. The most convincing evidence of this is afforded by a layer of peat at Haagenstad salt-pan, about thirty miles north of Bloemfontein. Below the upper layer of pure peat, 8 to 10 ft. thick, is another layer, of about the same thickness, composed of peaty sand, and beneath this is a bed of broken bones, burnt bones, and human implements. Although most of the implements were unfortunately dispersed, a stone spear-head and knife secured for the Bloemfontein Museum amply attest their human origin. Among several species of extinct and existing mammals, special interest attaches to the frontlet and horn-cores of a gnu (*Connochœtes antiquus*), which are stated to be almost exactly intermediate in character between those of the white-tailed gnu (*C. gnu*) and the brindled gnu (*C. taurinus*). The same issue contains six papers, some by Dr. Broom, others by Mr. S. H. Haughton, and others by both writers, on new and other vertebrates from the Permo-Triassic beds of South Africa.

Dr. Hans Preuss has published (*Schriften der naturforsch. Ges.*, Danzig, Band 13) an elaborate account of the vegetation of the Baltic coast of Germany (Schleswig-Holstein, Mecklenburg, Pomerania, West and East Prussia), his paper of 213 pages being illustrated by sixty-two photographs. This important paper is of great interest to ecologists in Britain, since the maritime vegetation of the North German coast presents considerable general resemblances to that of our shores, apart from its greater richness in species and the presence of such groups as the "Pontic" forms, which have doubtless migrated from the warmer regions of Central Europe along the river valleys to parts of the Baltic littoral.

Prof. V. Arcichovskij has forwarded reprints of five recent papers appearing in various German and Russian journals. Two of these give descriptions of methods for experimental work with seeds freed from micro-organisms; in one of these the author describes and figures a modification of Hansen's sterile chamber, adapted for investigations with sterilised seeds and for pure cultures of higher plants. A third paper deals with the culture of higher plants in a simple air-chamber improvised from an ordinary flower-pot; excellent results were obtained in the cultivation of bean plants in moist air, the nodules being unusually large and numerous, as well as with other species, and the author advocates this method in preference to the use of water or sand cultures, in which access of air to the roots is hindered by the excess of water used.

Mr. J. F. Dastur, of the Agricultural Research Institute, Pusa, has published (Memoirs Dept. Agriculture in India, vol. v., No. 4) an account of a new disease of the castor-oil plant caused by *Phytophthora parasitica*, n. sp. In his introduction the author gives a brief account of the cultivation of the castor-oil plant in India, and the varied uses to which the oil is put besides that due to its medicinal properties. Though so widely distributed, this plant has hitherto been regarded as immune from serious fungus pests, except the castor rust, but at Pusa the crop has been attacked by two serious pests, the new Phytophthora now described and a species of Cercospora, to be dealt with later. The former destroys seedlings by causing "damping off," and also attacks leaves of older plants, and is the most injurious of the fungal parasites of castor. The structure and life-history of the fungus are fully described and illustrated by means of ten excellent plates, one being coloured to show the characteristic brown leaf spots which form the first external indication of the disease.

Technical Bulletin No. 16 of the Michigan Agricultural College Experiment Station deals with the grain-size and moisture content of soil in relation to bacterial activity. Aëration and thickness of the moisture film may be considered to be the important physical factors of the soil in relation to the activity of aërobic bacteria. Aëration increases as the square of the grain-size, while the increase of the moisture film is directly proportional to the grain-size. A coarse soil is therefore of advantage to the aërobic bacteria. The grain-size in cultivated soils is generally so small that the optimum moisture film is reached only in the waterlogged state.

In the Bulletin of the Imperial Earthquake Investigation Committee (vol. v., pp. 109–37), Prof. Omori again directs attention to the small slow movements of the ground which he calls pulsatory oscillations. The period of these oscillations ranges from about four to about eight seconds, and Prof. Omori shows that the period at a given moment is identical even at Tokyo and Osaka, which are nearly 250 miles apart, not only in its mean value, but also in its variation from day to day. The amplitude of the oscillations is much greater on soft than on hard ground, and Prof. Omori suggests that the oscillations are produced at some depth in the solid crust and magnified when transmitted to the soft soil of the alluvial plains. A remarkable feature of pulsatory oscillation is their complete dissimilarity at stations only a few miles apart, it being impossible to identify the different maximum groups even at two observatories in Tokyo. This indicates that pulsatory oscillations are not the results of a progressive disturbance like an earthquake. Prof. Omori regards them rather as the results of underground disturbances originating at an infinite number of points, due probably to volcanic activity or to changes in the internal pressure caused by the transit of a deep barometric depression or by the existence of heavy ocean swells.

Mr. R. C. Mossman (Argentine Meteorological Office) has contributed to *Symons's Meteorological Magazine* for June the third of his useful articles on southern hemisphere seasonal correlations. During the months January to March a remarkable parallelism is pointed out since 1897 in the curves of mean temperature at Alice Springs (Australia) and Cordoba (Argentine Republic), both stations being located in a continental situation. In eleven out of fourteen years discussed (1897–1910) the departures from the means for the period have the same sign. But previous years (1879–96) show no definite agreement. During the same months an opposition is generally shown in the mean temperature curves at Perth (Western Australia) on one hand, and at Valparaiso and Santiago (Chile) on the other; for Valparaiso data for only nine years (1901–9) were available. There is also an opposition between the mean temperature at Santiago and the thickness of the ice at Duluth (Lake Superior). These results, as Mr. Mossman remarks, are of interest as they indicate an inter-relation between the action centres governing the conditions during the period in question in Australia, South America, and the United States.

A well-illustrated article in the Journal of the Franklin Institute for May reproduces an address given before the institute in January by Mr. E. A. Sperry, president of the Sperry Gyroscope Company, and deals with the engineering applications of the gyrostat. It appears that the gyroscope has been successfully applied to the stabilising of the United States steamer *Worden*, and that the application has enabled a more complete study of the effects of rolling of vessels on the power necessary to propel them to be made. To the gyrostatic compass we have directed our readers' attention previously. The application of the gyrostat to the control of the wings and rudders of an aëroplane has now been successfully carried out, and we have, in addition, recorders of the rolling and pitching of vessels and artificial horizons depending on the gyrostatic principle, all working satisfactorily.

The report of the Advisory Committee for Aëronautics for the year 1912–13 gives a general account of the work accomplished. The construction of the new four-foot wind channel at the National Physical Laboratory has been undertaken in the light of numerous experiments, and the pulsations in the flow which are the chief cause of difficulties in air-channel experiments have been so much reduced that the accuracy of individual measurements can be relied on in general to within one-half per cent. This channel replaces one of the same size, but a new 7-ft. channel is projected, and the necessary sum for its construction will be included in the estimates for 1913–14. In this respect the laboratory will be provided with means for experiments on fully rigged models of complete aëroplanes, an acceptable addition to its resources too long delayed. Amidst a number of interesting and important researches carried on, the investigation of the stability problem will command most attention, alike from mathematicians, physicists, and from those who have to trust themselves to their incessant vigilance to keep their frail craft upon an "even keel" in the air, and we therefore are glad to note that great advance has been made in the study and investigation of this problem, though sufficient time has not elapsed to put the knowledge so derived to the test of practical application. The close relationship between the work carried on at the Royal Aircraft Factory and that at the laboratory gives reason to hope that the inevitable divergence between laboratory and full-scale experiments will be ascertained and allowed for, and we are glad to note the cooperation that exists to forward the experiments. We hope to return to the work of this department of the laboratory when the technical report of the committee is ready.

In a paper published in the *Gazzetta Chimica Italiana* (vol. xliii., i., 38) Prof. F. Angelico and Mr. F. Catalano have brought forward additional evidence in support of the generally accepted view that traces of formaldehyde are present in the foliage leaves of plants during the period of active assimilation under the influence of sunlight; they show, moreover, that formaldehyde is absent when the same plants are kept in darkness so as to suppress the chlorophyllian function. Parasitic plants, such as *Psalliota campestris* and Coprinus, which do not contain chlorophyll, also fail to give any indication of the presence of formaldehyde. The authors made use in their experiments of the glucoside atractylin, which is present in *Atractylis gummifera*; this substance they find to be the most delicate test yet devised for minute traces of formaldehyde; a solution obtained, for example, by adding three drops of 40 per cent. formaldehyde to one litre of water gives, under suitable conditions, a distinct violet coloration with the reagent. This behaviour is quite specific, no other aldehyde or substance responding in the same way.

The report of the meeting of the Swiss Scientific Association held last autumn at Altdorf includes accounts of the many permanent commissions which the association has instituted. One of the most notable is in charge of the definitive edition of Euler's works; five volumes, including the "Algebra," "Dioptrica," and "Mechanica," have been published since 1911. The work of the geological commission and the glacier commission is prolific in measurements, maps, and observations. The nature protection commission, instituted in 1906, is successfully carrying out the project of a *grande réserve,* or national park, in the Grisons (the commune of Zernetz). Newly instituted is the commission for the study of atmospheric electricity. Among the papers read, a comprehensive study of the mountain structure of central Switzerland, by Dr. P. Arbenz, is one of the most considerable. Mr. Weiss discusses recent research in molecular physics, and his own work on magnetons. "Radiation and Matter," by von Kowalski, includes investigations in atmospheric electricity; Mr. R. Chodat describes the problems of plant-coloration and his own important experiments in this difficult subject. Mr. Pictet shows that the flight of insects in relation to artificial light is not a case of tropism. Very interesting conclusions on the effects of storms upon forests are drawn by Mr. van Ufford from the destruction of the forest at The Hague in 1911. Mr. Mirimanoff carries further than Poisson and Oettinger the mathematical theory of the game *trente et quarante.* The sixty-nine papers read at the meeting are well distributed among the various sciences, and deal in many cases with significant and important research.

Prof. J. Walker, F.R.S., of Edinburgh University, is just completing a "Text-book of Organic Chemistry for Students of Medicine," which will shortly be published by Messrs. Gurney and Jackson, London, and Messrs. Oliver and Boyd, Edinburgh.—Dr. Reinheimer is about to issue through Messrs. Kegan Paul, Trench, Trübner and Co., Ltd., a volume entitled "Evolution by Co-operation: A Study in Bio-Economics."—"The Living Plant," a description and interpretation of its functions and structure, by Dr. W. F. Ganong, will be published shortly by Messrs. Constable and Co., Ltd.

OUR ASTRONOMICAL COLUMN.

A Meteorite Seen to Fall and Found.—It is not often that a meteorite is actually seen to fall to the ground, but this was the case with the specimen described by Messrs. Masumi Chikashige and Tadasu Hiki, in the Memoirs of the College of Science and Engineering, Kyoto Imperial University (vol. v., No. 1, September, 1912). It was at 6.30 on the morning of April 7, 1904, that the meteorite fell at the village of Okano, in the neighbourhood of the town Sasayama, in the province of Tamba, Japan. The white glowing mass was observed by a peasant, and when he came to the spot he found a stone which looked like a block of iron with the long point upwards, and imbedded about 80 cm. A teacher 30 km. to the north observed the meteorite also as a white glowing mass, at an altitude of about 70°. The chemical analysis, which is given in the paper, is as follows, in percentages:—Iron, 94·85; nickel, 4·44; cobalt, 0·48; copper, trace; phosphorus, 0·23. Thus nickel-iron amounted to 98·52 per cent., and phosphor-nickel-iron 1·48 per cent. This result is very similar to that obtained in the De Sotoville meteorite, namely nickel-iron 98·71 per cent., and phosphor-nickel-iron 1·29 per cent. The authors complete their monograph with three excellent plates showing the external appearance of the meteorite and sections before and after treatment.

Measures of Proper Motion Stars.—The Carnegie Institution of Washington has just issued another large volume (No. 168), the contents of which in this case consist of the valuable series of measures of proper motion stars made by Mr. Burnham with the 40-in. refractor of the Yerkes Observatory in the years 1907 to 1912. Attention may be directed in the first instance to the promptitude of publication of such a mass of valuable data, for this large volume, containing no fewer than 311 pages, includes measures so recently made as last year. The total number of measures made in the present work is about 9500, and all places are given for 1880 unless otherwise mentioned. The original places as given in the General Catalogue of Double Stars have been retained, and the stars in part i. reduced to the same epoch. The measures are published in two parts. The larger number of stars selected for measurement are given in part ii. of this volume, and are taken from the General Catalogue of Double Stars for reasons stated in the notes and observations in that work. Part i. includes all other stars for which prior observations with the micrometer have been made. The small stars from zone 26° of the Oxford Astrographic Catalogue were compared with one or more fainter stars in the field. Mr. Burnham has added three more stars, namely 37 Tauri, 55 Tauri (OΣ 79), and OΣ 82, to the list of Boss's thirty-nine bright stars, principally in Taurus, which appeared to have a common proper motion of approximately 0·10″ in the general direction of about 100°.

The Total Solar Eclipse of August 30, 1905.—In a beautifully got-up portfolio measuring about 20×25 in., just issued by the Hamburg Observatory, Prof. R. Schorr publishes a series of nine reproductions illustrating the photographs of the